

# Advanced border alert system using GPS and with intelligent Engine control unit

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**ABSTRACT:** *This paper introduces an intelligent design which would transform the life of fishermen community in India. One of the problems faced by the Indian fishermen is the arrest made by the neighbouring country. This is because of the lack of knowledge of their position across the sea. This problem can be overcome with the dynamic location of the vessel by using the Global Positioning System and the Electronic Control Unit that has ARM7 microprocessor. This processor is fed with the appropriate latitude and longitude which is taken as the reference, when the boat crosses the maritime boundary initially it alerts the fishermen with the alarm and radiates the location of the boat to the nearest coast station via GSM communication. When it further nears the maritime boundary an interrupt is sent to the Engine Control Unit which controls the speed of the engine with the help of the electronic fuel injector. Though there are many proposed system they are not viable due to its high cost and due to the lack of stopping the vessel, but this proposal coins a low cost maritime border crossing alert system by amalgamating the potency of marine GPS device and the Electronic control unit. By this method, we can alert the fishermen and also monitor them thereby preventing illegal activities such as smuggling, intruders, etc*

**KEYWORDS:** *GPS, Engine Control Unit, Electronic fuel injector*

## I. INTRODUCTION:

The issue of fishermen straying into each other's territorial waters has come as a potential irritant, of which the Indian fishermen are usually charged of trespassing the maritime boundary. So to stop our fishermen from crossing the border we have developed a method to stop our fishermen navigating towards the other country's border. The main objective of this paper is to detect the location of the boat via GPS which is the most accurate and fastest way of locating the vessel, alert them with an alarm and to stop the boat from trespassing into the Sri Lankan border. The reason to stop the boat

is to prevent smugglers and intruders to neglect the alarm and alert the coast guard.

## II. EXISTING SYSYTEM:

At present there are many proposed systems which help to identify the current location for the vessel. The systems are GPS and radar based which were run over by coastal guards. Other systems include such as the android application, WSN based (RSSI) [1]. But the above systems are not possible due to its short range, high cost, time efficiency, etc. The major drawback of this existing system is that they never provided a accurate way to control the speed of the outboard motor which is used by our common fishermen. All these defects are overcome in our proposed works.

## III. PROPOSED SYSTEM:

The proposed system is used to denote the boundary to the fishermen and to stop the boats from trespassing into the border. It is done by GPS which receives a signal from the satellite and gives the current position of the boat. The arm processor is programmed to compare the current longitudes and longitudes with the stored longitudes and longitudes of the border. Each boat has a unique number through which a record of how many boats is monitored in the control station [2]. Thus guards in the shore can reach out the fishermen quickly. Our system provides an indication to both the fisherman and to the coastal guard. Thus this system alerts the fishermen and the coast guard about the position of the boat. Further attempts of crossing the border neglecting the alert can be prevented by controlling the engine through the engine control unit.

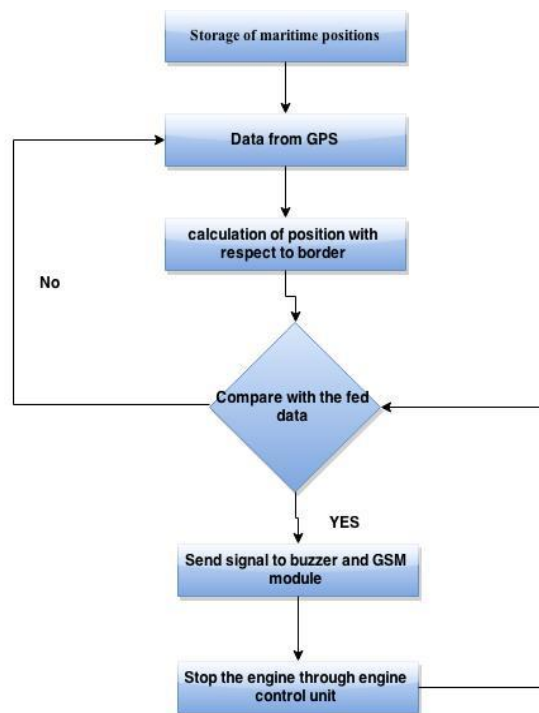


Fig 1, Flowchart of the process

#### IV. GPS:

The Global Positioning System (GPS) is a space-based satellite navigation system which provides latitude and longitude positions on the Earth. The satellite observes the latitude and longitude of the boat's position and sends the data to the control unit. This facility enables to find out whether the vessel has crossed the border or not. This gives the current position of the boat to the ARM 7 processor in the Engine Control Unit. It compares the current position and stored boundary position if the vessel is at a distance of one kilometre from the boundary causes the processor to generate an alarm [3]. Using an algorithm, the position of the vessel with respect to boundary is found. The latitude and longitude positions from the GPS are taken from the microcontroller. The latitudes and longitudes received from the microcontroller is compared with the stored longitudes and longitudes [4].

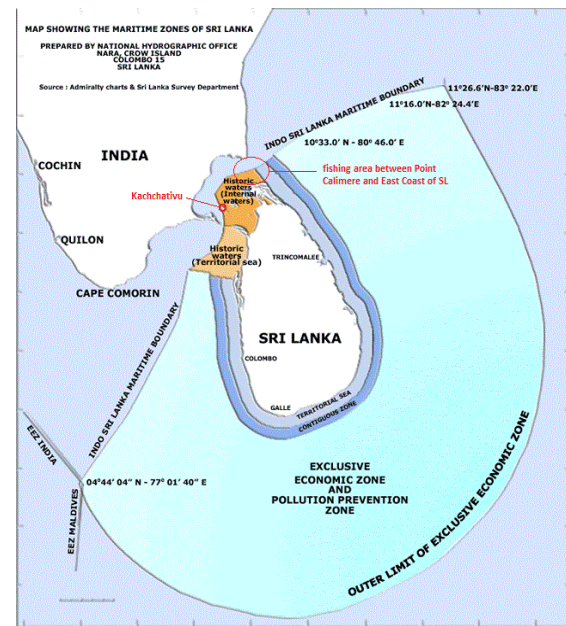


Fig 2, Satellite picture of India - Sri Lankan border

#### V. GSM:

As then GSM cannot be placed in the middle of the oceans. So the GSM is placed in the coastal control station. Thus the station continuously receives the GPS information through the unique GPS address. The main aim of this GSM system is to ensure continuous monitoring of each boat to prevent smuggling, intruder actions etc [5].

#### VI. ENGINE CONTROL UNIT:

The ECU consists of an ARM 7 microprocessor, random access memory (RAM), read only memory (ROM), and an input/output interface. This unit is used to control the speed of the motor when it crosses the boundary. The Electronic Control Unit (ECU) can control almost every operation in an engine including ignition systems. It can be designed in any way to meet the demands. In our electronic control unit we use an electronic fuel injector with a solenoid valve to control the fuel supply in the engine [6]. When the alarm is generated it is necessary to stop the engine from moving. So we use an electronic control unit to control the engine. A normal ECU controls an engine with a fuel injection system. The fuel injector is fitted with a solenoid valve which is a

electromagnetically controlled mechanical valve. When the GPS position matches the stored GPS location the output of this process is given to the input of the fuel injector. When the input is given to the fuel injector to the solenoid valve it cuts the fuel supply to the engine. Here the output of the first process is given as a input to the fuel injector. So this in turn cuts off the fuel supply which stops the engine from moving forward.

## VII. POWER SUPPLY:

The power supply is provided by fuel, solar panel, and from a small generator coupled to it. The arm7 processor is programmed in such a way that in case of low power it also draws power from all these sources to power the circuit.

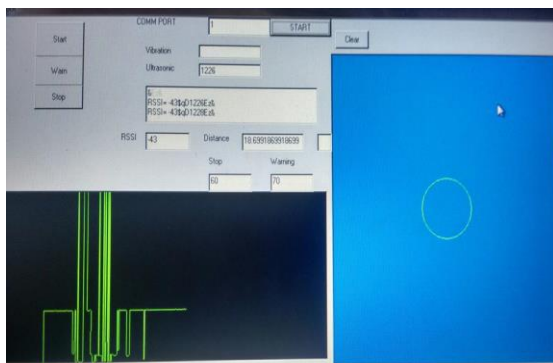


Fig 3, simulated output while inside the border

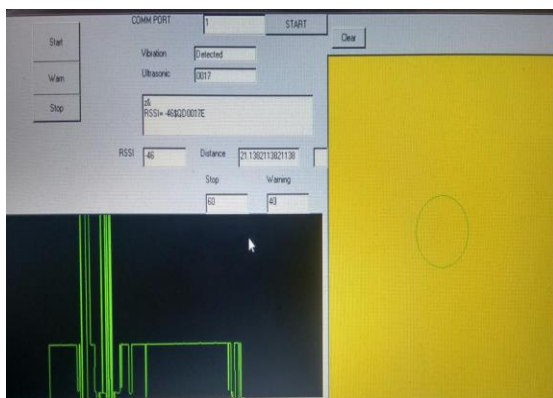


Fig 4, simulated output in warning Zone

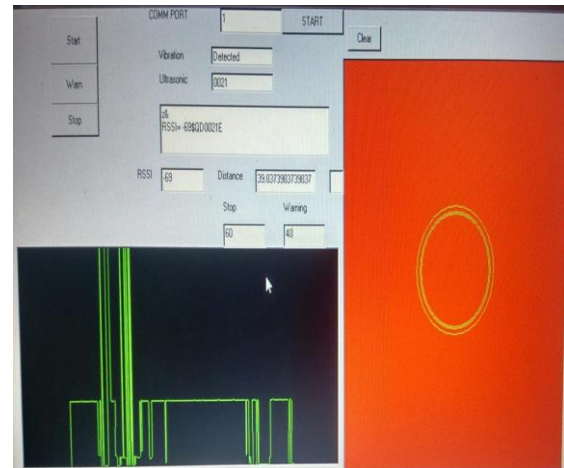


Fig 5, Simulated output in danger zone

## VIII. CONCLUSION:

In the recent times the arrest of Indian fishermen across Sri Lanka and Pakistan has been increased. The fishermen find it difficult to keep note of the borders and stray into other country's borders. Our aim is to give wireless support to those fishermen and also to track them if they are found missing. Our other aim is also to stop illegal activities such as smuggling. This project is a low cost efficient method of wireless tracking. It also gives sufficient information to both ship and coastal guardians of anyone crossing the border. The process of routing the fishermen will make it more efficient. The process of increasing the accuracy will be achieved greater in the near future.

## IX. REFERENCES:

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